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How Animal Well-being Affects Perceptions of Pollution

THE EFFECT OF WILDLIFE WELLBEING ON ENVIRONMENTAL CONCERN

by

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THE EFFECT OF WILDLIFE WELLBEING ON ENVIRONMENTAL CONCERN

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Environmental campaigns have used animal imagery to push their initiatives for years, shocking viewers with images of human caused damage to change environmental behavior. The Royal Society for the Prevention of Cruelty to Animals (RSPCA), a nonprofit located in Britain released a statement that they responded to 5000 calls annually regarding litter and that the main victims were wildlife species (Litter and Animals | Rubbish and Animals - RSPCA, 2017). A previous study done by Schultz (2000) showed animals in different conditions (animals in nature and animals harmed in nature), with results indicated that those who viewed an image of a harmed animal showed higher environmental concern (Schultz, 2007). The current study extends this research, aiming to link human empathy and environmental concern to animal welfare and environmental degradation. Through a three-treatment survey experiment, this study finds that there was no significance in emotional difference between groups. While hypotheses had to be rejected, participants in Treatment 1 and Treatment 3 showed higher environmental concerns in the studies post questions. Though there was no great significance, the study shows that animals that do not seem harmed in a litter ridden landscape may ease environmental concern in viewers.

Introduction

The United States produces more than 250 million tons of trash annually, with a percentage not going into the landfill (EPA, 2019). Pollution, specifically litter, is the discarding of trash in any general natural area from which it did not come. Fast food wrappers, cigarette butts, and plastic bags are the most common litter found in the United States (May, 2018). Other forms include aluminum cans, glass bottles, and plastic. Instead of a landfill, these products end up on roadways, sidewalks, and along hiking trails or in waterways.

While litter can be dangerous for humans, it can be deadly for animal species. Products with a narrow opening such as bottles have the potential to capture small mammals when they try to reach into the product for resources such as water or leftover food. When this occurs, the animal may be unable to release themselves from the product and become stuck which may lead to starvation/dehydration, suffocation, or neck lacerations. Other items, such as cigarette butts are poisonous to both animals and humans when eaten. The Royal Society for the Prevention of Cruelty to Animals (RSPCA), a nonprofit located in Britain released a statement that they responded to 5000 calls annually regarding litter and that the main victims were wildlife species (Litter and Animals | Rubbish and Animals - RSPCA, 2017).

Attitudes towards wild animal species become important when marketing a green initiative such as pollution cleanup. These initiatives have tried to curb littering and environmental degradation by appealing to human interest by evoking feelings of empathy or sadness from the viewer. Animal welfare has been spotlighted in climate change television and poster campaigns using heavily impacted species as the focal point. The World Wildlife Foundation (WWF) has many campaigns heavily involved in ocean litter and pollution, using

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images of sea turtles and fish interacting with the litter. Another campaign called “Litter Kills”, run by Clean Up Britain, focuses on personal litter and environmental behavior. Marketing for this campaign involved the use of “shocking” photography, showing animals such as dogs injured by litter to create a strong reaction from the viewer (LITTER KILLS - Clean Up Britain, 2018). Yet, it is not clear how effective these campaigns are in encouraging more responsible consumption and refuse patterns. The following study will test how effective the tactic of “shocking” the viewer in these campaigns are, by using a three-treatment survey experiment. By presenting participants with images varying in extent of harm litter causes wildlife, I test how empathy and reminder of harm impact the likelihood of acting pro-environmentally.

Literature Review

Environmental sociology

To study this question, theory and methodology from the field of environmental sociology are most useful. Environmental sociology was first discussed in the 1970s as a subdiscipline of sociology. Frederick Buttel’s review “New Directions in Environmental Sociology” defines environmental sociology as, “Attitudes, values, and behaviors which change with societal movements and the political environment.” This review also discusses the effects of environmental movements and political standings on environmental behavior. From this research, norms were found to play an important role in changing environmental behaviors. A norm is behavior and values of a group of people, often politically or demographically connected, who become aware of a new situation, change their views, and others outside of the group follow suit (Buttel, 1987). Riley Dunlap’s 1980 paper, “The Social

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Basis of Environmental Concern” tests how age, class, residence, sex, and political standing give way to environmental concern. These generally coincide with a higher environmental concern within younger more educated people (Dunlap et al. 1980). When trying to change perception, looking at those with a lesser concern is an important factor. Pinpointing the causes of behavioral change in a large portion of the population enables researchers to prompt change.

We can assume that most people recognize pollution as hazardous to living species, but the intensity of these feelings can differ. Because of how emotions vary significantly from person to person, the design of this research will show how the use of a diverse set of species can influence our feelings on pollution. Biophobic species like snakes and spiders have been a hazard to humans throughout evolution and produce a conditioned response in the brain which is “easily learned and not easily forgotten” (Ulrich 1993). Schultz provided evidence that people develop greater concern for situations in which they view themselves connected to. One of his hypotheses tested in this study is that taking the perspective of a situation of an animal harmed by pollution will induce a higher level of concern for their welfare than remaining objective (Shultz 2000). Seeing or hearing another have a specific reaction towards interaction with wildlife activates those same emotions in the viewer’s brain, called the “Perception-Action Model”. While emotions evolve and change, they commence during early childhood (Myers, et al., 2009). While it is important to conduct studies around these ages, it is equally important to note emotional tendencies in early adulthood such as college-aged participants.

Empathy

Morals, values, and upbringings heavily impact human emotions. By studying emotional changes when viewing a wildlife species in varying levels of distress, conservationists can

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identify how to influence mindsets. When individuals exercise empathy towards a wildlife species in distress, there is a significantly higher likelihood of exhibiting compassion and concern towards the species (Myers, et al., 2009). Empathy, unlike sympathy, looks to understand the situation that another is in fully and objectively; motivated by concern (Fox, 1984). A previous study done by Schultz (2000) showed animals in different conditions (animals in nature and animals harmed in nature). Results concluded that those who viewed an image of a harmed animal showed higher environmental concern (Schultz, 2007). There has been much work on biophilia: the innate act of caring for different species and empathy towards these species. These studies relate past experiences and hereditary values to show how human emotions can vary towards different species. Understanding the processes of empathy enables a transition to discuss environmental sustainability by asking a central question: does animal wellbeing affect our perception of pollution, regardless of species?

Attitudes towards wildlife species are highly influenced by past experiences with those species, especially for those who own domesticated animals. Interactions with domesticated animals tend to spread these positive feelings outwards to wildlife that they may not have had previous contact with (Bowd, 1984). In Contrast, if a person has a negative experience with a wildlife species during childhood or their past, these feelings generalize their overall attitudes towards wildlife species (Bjerke et al., 2003). These have the potential to sway attitudes during this study, especially if the participant has a negative experience with the species of interest. In Bjerke's study, "attitudes and activities related to urban wildlife: pet owners and non-owners" pest species, like rats and squirrels, overall had a lower desirability score. With this in mind, seeing how emotions change with species of low desirability can generalize empathy to animals injured by anthropogenic pollution.

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Media

Art and media have used animals to generate thought and action for centuries. Depending on the message personification of animals, where they are made to have human-like thought and feeling, occurs. Human viewers mirror these emotions given by the animal, including distress and joy. Anthropomorphism is the tendency for humans to attach human behavior to another species (Manfredo, 2008). Borgi et al. "Baby schema in human and animal faces induces cuteness perception and gaze allocation in children" tests what characteristics of an animal gains a nurturing effect from humans. The term baby schema "is a set of infantile physical features such as the large head, round face and big eyes that is perceived as cute and motivates caretaking behavior in other individuals, with the evolutionary function of enhancing offspring survival" (Borgi 2014). When looking at the psychological portion of human's interest in animals, it has been seen to develop in the early stages of youth. Borgi's study concluded that there is an overall preference for infantile species which have all the characteristics mentioned above.

Derek Bouse's paper "Are wildlife films really "Nature Documentaries?" studies the differences in documentaries and entertainment films. Wildlife films often use voice-over narration to describe the situation and personify the animal. This, as well, as the picking and choosing of scenes often allows for conveying specific emotions. As they are unable to vocally explain their actions voice-overs are done in commercials, shows, and documentaries to help the audience gauge situations they may not have known how to respond to without (Bouse, 1998). Media personification of animals allows viewers to view a situation and interpret it in their own way, often creating an attachment to the species viewed, and allowing for a

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sympathetic reaction to occur. By subjectively looking at the situation and actually understanding the situation, empathy occurs (Fox, 1985). By using an animal primarily regarded that is regarded primarily as negative in media to show a feeling of empathy, we can affect the viewer's emotion and manipulate or change it from negative to positive.

Hypotheses

The objective of this study is to link human empathy and environmental concern to animal welfare and environmental degradation. The following hypotheses have been derived from the literature reviewed above:

- (1) Individuals who are made aware of the harm of litter will have greater a environmental concern.
 - Pollution is seen as one of the most harmful practices towards wild animal populations. Dubois, in his paper “Rating Harms to Wildlife”, (Dubois, 2013) had consistent results throughout the sample population that pollution was of high concern regarding wildlife harm.
- (2) If shown a photo of an injured animal due to human action, such as pollution, empathy for the animal will increase.
 - It has also been found that participants viewing animal injured through a perspective-taking, or empathetic view, had greater environmental concern than those who did not. Dispositional empathy, or trait empathy, is the inherent ability for humans to perceive a situation as if they were in it themselves (Sevillano et al, 2007).

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(3) Younger more educated people will have greater environmental behavior regardless of the photo shown.

- Dunlap et al. found that younger more educated people had a greater environmental concern. This was due to the fact that these people are more exposed to information than generations before them. Through more information, younger people are able to have greater understandings of specific environmental problems and comprehend their parts in these. As well as this there has been neurological research that points towards adolescents (ages 10-24) who have quicker empathetic reaction time than adults (Myers, 2009).

Methodology

Study Design

This mixed-method study, using both qualitative and quantitative data, will include closed-ended questions and a reflection. Closed-ended questions will gather participant background including their education level and gender. Before the treatment portion of the survey, participants will be asked the following eight questions from Davis' Interpersonal Reactivity Index (IRI)¹ and Dunlaps NEP², which will be used to gauge their dispositional empathy and general environmental attitudes:

- I often have tender, concerned feelings for people and animals less fortunate than me.¹

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- When I see someone being taken advantage of, I feel kind of protective towards them.¹
- Other people's misfortunes do not usually disturb me a great deal.¹
- When humans interfere with nature it often produces disastrous consequences.²
- Human ingenuity will ensure that we do NOT make the earth unlivable.²
- Humans are severely abusing the environment.²
- The earth has plenty of natural resources if we just learn how to develop them.²
- Plants and animals have as much right as humans to exist.²
- The balance of nature is strong enough to cope with the impacts of modern industrial nations.²

At this point, the participant will be informed that they will then view a set of three photos, each over a 15-second time interval before being automatically moved forward to the next photo. Each participant will be randomly assigned to a treatment. Species were chosen to envelop the broad aspects of anthropogenic pollution on nature and their effects on avian, reptile, and mammal species. The examples below show one of the three species that are used in the survey. The three treatments are separated by the amount of interaction between a wildlife species and litter in a natural environment. Treatment 1, shown left, does not involve an animal species, focusing on litter instead, testing the base environmental concern. Treatment 2, shown middle, includes the animal species but there will be limited to no interaction

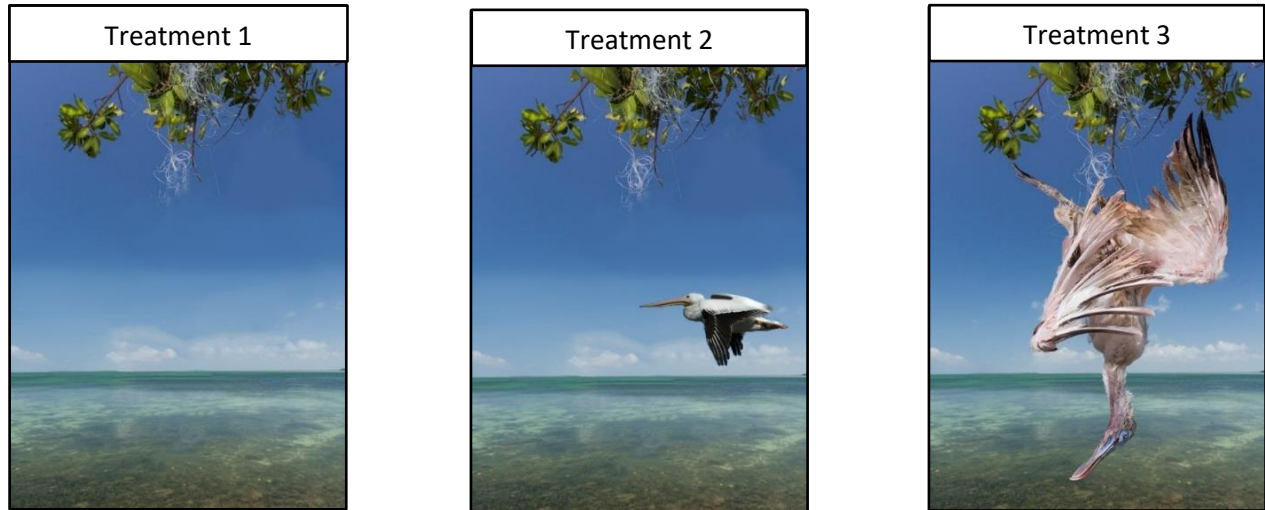
¹ Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology*, 10, 85.

² Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). New Trends in Measuring Environmental Attitudes: Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues*, 56(3), 425-442. doi: 10.1111/0022-4537.00176

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between them and the litter. Treatment 3, shown right, will involve a wildlife species heavily impacted by the pollution. Once the view time for each photo is up, participants were asked to reflect on the three photos, specifically on what they noticed and their initial emotion to each.

They were also asked if there were any differences in emotion between the photos shown.



Dunlap, et al. paper "Measuring Endorsement of the New Ecological Paradigm: A revised NEP scale," wrote 15 necessary background survey questions, four of which are direct anthropogenic causes and will be used in this survey (Dunlap et al., 2000). After completing their treatment reflection, participants were asked four questions from Dunlap's New Ecological Paradigm, shown below, which were used for comparison between each treatment. These are straightforward questions that will gauge the individual's response to pollution in the environment and their willingness to change their environmental behavior. To test hypothesis 1, the following questions were included after the treatment:

- To what extent do you believe wildlife is impacted by pollution?
- How concerned are you about litter?
- Should the United States government laws restricting litter be more strict, less strict, or about as strict as they are now?

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- How willing are you to change your lifestyle to reduce the damage you cause to the environment?

Study Implementation

The target audience of this study were students within the University of Nebraska-Lincoln during the Spring Semester of the 2019-2020 school year. Recruitment took place online through email and social media posts of the primary investigator. The survey was published through Qualtrics, with an expected response time of ten minutes per responder. In accordance with IRB regulations, all participation is voluntary and can be redacted at any time. No sensitive data such as IP address, name, or address will be gathered during the survey. The survey closed after one month to ensure data quality, and any outliers were deleted from the data set.

Results

Summary Statistics

There were 78 respondents from the United States, with 15 partial responses and 63 completed. The breakup between the treatments is as follows: 21 participants in Treatment 1, 24 in Treatment 2, and 18 in Treatment 3. Partial responses include response up to the treatment reflection with no response thereafter. About 70% of responses were female, with respondents averaging 20 years of age with college-level education. Overall, participants exhibited environmental concerns regardless of the treatment group. This may be due to limited recruitment outreach outside the bounds of the University of Nebraska-Lincoln's

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School of Natural Resources. Response regarding the Interpersonal Reactivity Index (IRI) are shown in Table 1 (see Appendix A). All participants exhibit empathetic behavior.

IRI Question	Treatment 1 (background)	Treatment 2 (uninjured wildlife)	Treatment 3 (injured wildlife)
I often have tender, concerned feelings for people and animals less fortunate than me. 1 (Very much like me)- 5 (Not at all like me)	1.5	1.5	1.4
When I see someone being taken advantage of, I feel kind of protective towards them. 1 (Very much like me)- 5 (Not at all like me)	2.4	1.3	1.4
Other people's misfortunes do not usually disturb me a great deal. 1 (Very much like me)- 5 (Not at all like me)	4.1	3.9	3.6
<i>Average</i>	2.7	2.3	2.1

Table 1. Average values per treatment group for the preliminary questions prior to treatment reflection. Numerical values represent the response from 1 (very much like me) to 5 (not at all like me)

Table 2 shows the results of the pre-treatment NEP portion of the survey. All participants shared a common mindset regarding humans' interaction with the natural environment. There was only a .06 difference between the three groups, illustrating the belief that humans may cause permanent damage to the environment. While Treatment 2 did not display high empathy, their responses to the NEP questions displayed a greater concern for the natural environment and the effects that humans have on it.

NEP Question	Treatment 1 (background)	Treatment 2 (uninjured wildlife)	Treatment 3 (injured wildlife)
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When humans interfere with nature it often produces disastrous consequences. 1 (Agree)- 3 (disagree)	1.4	1.6	1.4
Human ingenuity will ensure that we do NOT make the earth unlivable. 1 (Agree)- 3 (disagree)	1.7	2.2	2
Humans are severely abusing the environment 1 (Agree)- 3 (disagree)	1.3	1.3	1.1
Animals have the same right as humans to exist. 1 (Agree)- 3 (disagree)	1.6	1.4	1.4
The balance of nature is strong enough to cope with the impacts of modern industrial nations. 1 (Agree)- 3 (disagree)	2.7	2.5	2.8
<i>Average</i>	<i>1.74</i>	<i>1.8</i>	<i>1.74</i>

Table 2. Average value per treatment group for preliminary New Ecological Paradigm (NEP) questions. Numerical Values represent the response from 1 (agree) to 3 (disagree).

Once shown the images, participants were asked questions regarding their personal feelings towards pollution and environmental regulation of the United States. 76% of respondents believe that wildlife is negatively impacted by pollution and 20% believe they are only somewhat impacted. Overall, 95% of respondents are concerned about litter and 89% believe that the government's laws concerning litter should be stricter. Just a little over 90% stated that they were willing to change their habits to reduce environmental damage but only 66% were very willing to do this. Table 3 shows the average results of the responses from a scale of 1 to 5.

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Post Treatment Question	Treatment 1 (background)	Treatment 2 (uninjured animal)	Treatment 3 (injured animal)
To what extent do you believe wildlife is impacted by pollution? 1 (Very much) - 5 (not at all)	1.3	1.3	1.2
How concerned are you about litter? 1 (Very concerned) - 5 (Not at all concerned)	1.3	1.3	1.3
Should the United States government laws restricting litter be more strict, less strict, or about as strict as they are now? 1 (More strict) – 3 (less strict)	1	1.3	1
How willing are you to change your lifestyle to reduce the damage you cause to the environment? 1 (Very willing)- 4 (Not at all willing)	1.3	1.4	1.5
<i>Average</i>	1.225	1.325	1.25

Table 3. Average value per treatment group for New Ecological Paradigm (NEP) questions, used to compare between groups.

Testing Hypothesis 1

An independent samples t-test was conducted to compare results of the question “How willing are you to change your lifestyle to reduce the damage you cause to the environment?” between treatments. Table 3 indicates the environmental concern of each treatment group after the treatment reflection. Three comparisons were made, results indicated in tables four through six. The average results, see table 3, indicate a high environmental behavior for participants in

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the study, but these values are not statistically significant. Due to lack of significance, we cannot reject the null hypothesis of all treatments being equal with regards to willingness to change lifestyle.

T TEST: Equal Variances			Alpha		0.05				
	<i>std err</i>	<i>t-stat</i>	<i>df</i>	<i>p-value</i>	<i>t-crit</i>	<i>lower</i>	<i>upper</i>	<i>sig</i>	<i>effect r</i>
One Tail	0.192199	0.44112	41	0.330722	1.682878			no	0.068728
Two Tail	0.192199	0.44112	41	0.661444	2.019541	-0.47294	0.30337	no	0.068728

Table 4. There was not a significant difference in scores for Treatment 1 (M= 1.29, SD= 0.72) and Treatment 2 (M= 1.25, SD= 0.44) conditions; $t(41) = .44$, Two-tail $p = 0.66$. This indicates that both groups have similar environmental behavior.

Table 5. There was not a significant difference in scores for Treatment 1 (M= 1.29, SD= 0.72) and

T TEST: Equal Variances			Alpha		0.05				
	<i>std err</i>	<i>t-stat</i>	<i>df</i>	<i>p-value</i>	<i>t-crit</i>	<i>lower</i>	<i>upper</i>	<i>sig</i>	<i>effect r</i>
One Tail	0.199381	0.899846	35	0.187176	1.689572			no	0.150372
Two Tail	0.199381	0.899846	35	0.374352	2.030108	-0.58418	0.225352	no	0.150372

Treatment 3 (M= 1.22, SD= 0.43) conditions; $t(35) = 0.89$, Two-tail $p = 0.37$. This indicates that both groups have similar environmental behavior.

T TEST: Equal Variances			Alpha		0.05				
	<i>std err</i>	<i>t-stat</i>	<i>df</i>	<i>p-value</i>	<i>t-crit</i>	<i>lower</i>	<i>upper</i>	<i>sig</i>	<i>effect r</i>
One Tail	0.231387	0.408964	38	0.342431	1.685954			no	0.066197
Two Tail	0.231387	0.408964	38	0.684862	2.024394	-0.56305	0.37379	no	0.066197

Table 6. There was not a significant difference in t-test scores for Treatment 2 (M= 1.25, SD= 0.44) and Treatment 3 (M= 1.22, SD= 0.43) conditions; $t(38) = 0.4$, Two-tail $p = 0.68$. This indicates that both groups have similar environmental behavior.

Testing Hypothesis 2

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There was an overall emotional reaction regardless to photo treatment but differences between species are shown and the amount of harm to species. When asked to state their emotion, respondents used words such as upset, sad, angry, and disappointed. On average, respondents stated that their general emotions did not change between photos but some feelings become more severe. The immediate observations made were the trash and litter before any wildlife or the natural setting behind, acting as a distraction to the viewer. A few respondents noticed the pattern used for the treatments, one stating “I definitely agree that we need to decrease our waste and emissions to try and make the Earth habitable for our next generations and the other animals that live here, but I don’t like feeling manipulated to think that way.”

The word “sad” was used 32 times between the groups, with treatment 3 using it 15 times, Treatment 2 and Treatment 1 using it 9 and 8 times, respectively. “Upset” and “angry/anger” were the following most used emotional keywords by survey participants, used 29 times throughout the reflections. Treatment 1 had the greatest use of these both words, with Treatment 3 following.

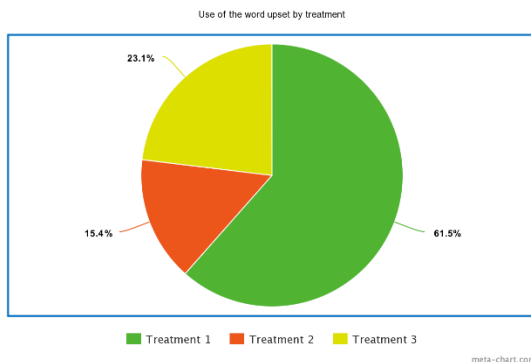


Figure 1. Difference in the word “upset” used between treatment groups.

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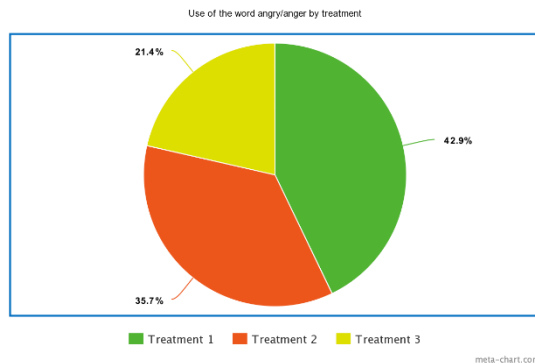


Figure 2. Difference in the word “angry/anger” used between treatment groups.

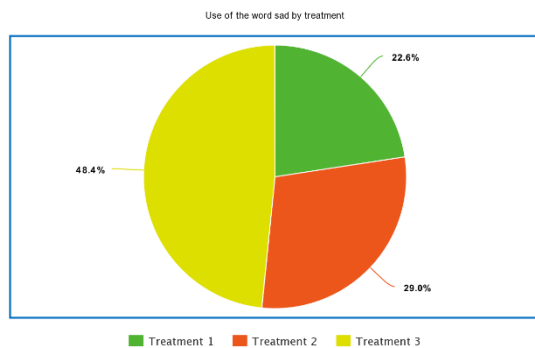


Figure 3. Difference in the word “sad” used between treatment groups.

While the skunk was the most relatable to the respondents, many indicated on both Treatment 2 and Treatment 3 that they did not care as much for the skunk as they did the other species. Participants stated that between the species shown, the image featuring the skunk and knocked over trash was the most relatable and fixable to the respondents. Responses indicating lack of concern for skunk are as following:

- “The skunk seemed to be digging through the trash for food. I felt less dread because it seems that maybe the skunk may be able to coexist with humans as they are.”
- “I had no problem with the skunk and the trash, as it was likely just finding food from the "waste."”

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- “My emotions on the first photo had me feeling mixed emotions, since the skunk was getting to enjoy a meal due to the trash left over. Also, the trash can was tipped over, so good human intentions for localizing their waste were attempted.”
- “Annoyed by the skunk, sad for the other ones.”

The photo featuring the fishing line in a tree was overlooked by respondents as the litter was hard to pinpoint. An important response that points to this issue is “If it’s not a glaring issue, chances are that people will look right past it”. This sentiment was stated a few times, indicating that more concern is shown for obvious anthropogenic litter. There were minor changes in empathy regarding species between the treatment groups, but not enough of a significance to reject the null hypothesis. Appendix B displays all reflections by the respondents.

Testing Hypothesis 3

The original blueprint for this study was to release fliers around the University of Nebraska-Lincoln campus to recruit anyone interested to take part. Due to current health advisories, the University of Nebraska-Lincoln was closed during the recruitment process for this study. Participants were therefore recruited through email and social media sites of the head investigator. Since much of recruitment took place through mass email to students in the School of Natural Resources, it may have skewed the results of the survey. While social media posts were available to those not part of the University of Nebraska-Lincoln the age and education backgrounds averaged to those in their 20s with a college education. Not enough data from individuals with varying demographic backgrounds decreased the ability to test the third hypothesis.

Conclusion and Discussion

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This survey experiment used three treatment groups displaying wildlife-pollution interactions at varying levels to test empathy response in relation to the research. The objective of this study was to see if empathy changes towards an animal interacting actively with pollution and comparing that to an animal interacting passively with pollution to see which leads to a change in the viewer's environmental behavior. While hypotheses had to be rejected, participants in Treatment 1 and Treatment 3 showed higher environmental concerns in the studies post questions (Table 3).

Davis' Interpersonal Reactivity Index, used pretreatment, had the most difference between groups (see Appendix A). Participants in Treatment 1 indicated a higher dispositional empathy than the other two groups. This may create a connection between the pre and post question averages. Greater statistical tests are needed to create a connection between pre and post treatment questions. Though there was no great significance, the study shows that animals that do not seem harmed in a litter ridden landscape may ease environmental concern in viewers. This study indicates the change in empathy regarding wildlife species harmed by litter. There are many environmental initiatives which aim at reducing terrestrial and marine pollution through the use of injured species visuals. This study shows the results of what could be used by those initiatives and their potential for changing behavior. Results of this study contradict those of past studies such as Schultz (2000) and Buttel (1987). Potential avenues for future studies include a more in-depth interview of respondents to highlight their emotions regarding injured wildlife with a larger sample population.

Resources

- Bjerke, T., Østdahl, T., & Kleiven, Jo (2003) Attitudes and activities related to urban wildlife: Pet owners and non-owners, *Anthrozoös*, 16:3, 252-262, DOI: 10.2752/089279303786992125
- Bousé, Derek (1998) Are wildlife films really “nature documentaries”?, *Critical Studies in Mass Communication*, 15:2, 116-140, DOI: [10.1080/15295039809367038](https://doi.org/10.1080/15295039809367038)
- Bowd, A. (1984). Development and Validation of a Scale of Attitudes Toward the Treatment of Animals. *Educational and Psychological Measurement*. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/0013164484442035?casa_token=rtz5ybr9NyEAAAAA:G0r248C3VJx6oKB-IylOr9ElhRHs2q79uBE65AARBLyZaOlgGEPewPU7Y1AWWe
- Buttel, Frederick H. (1987). New Directions in Environmental Sociology, *Annual Review of Sociology*, 13:46, 465-488. <http://dx.doi.org/10.1146/annurev.so.13.080187.002341>
- Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology*, 10, 85.
- Dubois, S., Faser, D. (2013). Rating Harms to Wildlife: A Survey Showing Convergence between Conservation and Animal Welfare Views, *Animal Welfare*, 22(1), 49-55
- Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). New Trends in Measuring Environmental Attitudes: Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues*, 56(3), 425-442. doi: 10.1111/0022-4537.00176
- Dunlap, R. E., Van Liere, K. D., (1980). The Social Bases of Environmental Concern: A Review of Hypotheses, Explanations and Empirical Evidence. *The Public Opinion Quarterly*, 40:2, 181-197
- Fox, M. W. (1985). Empathy, Humaneness and Animal Welfare. *Advances in Animal Welfare Science* 1984, 61–73. doi: 10.1007/978-94-009-4998-0_4
- Litter and Animals | Rubbish and Animals - RSPCA. (2017). [Rspca.Org.Uk. https://www.rspca.org.uk/adviceandwelfare/litter](https://www.rspca.org.uk/adviceandwelfare/litter)
- LITTER KILLS - Clean Up Britain. (2018, April 22). Clean Up Britain. https://cleanupbritain.org/litter_kills/
- Manfredo, M.J., Fulton, D.C. (2008). The Biological Context of Wildlife Values: Are There Etchings on the Slate? *Who Cares about Wildlife* (pp 29-44). Springer.
- May, A. (2018, August 9). *Worst types of litter: Plastic straws not even in the top 5*. USA TODAY; USA TODAY. <https://www.usatoday.com/story/news/nation-now/2018/08/09/plastic-straws-litter-common-trash-common-america/840806002/>

How Animal Well-being Affects Perceptions of Pollution

- Meyers, Jr. O. E., Saunders, C.D. & Besell, S. (2009). Fostering empathy with wildlife: Factors affecting free-choice learning for conservation concern and behavior. In J. Falk, J. Heimlich & S. Foutz (EDS.), *Free-choice learning and the environment* (pp. 39-55). Lanham, MD: AltaMira Press.
- National Overview: Facts and Figures on Materials, Wastes and Recycling. (2019, December 3). Retrieved February 24, 2020, from <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials>
- Schultz, P.W. (2000). Empathizing with Nature: The Effects of Perspective Taking on Concern for Environmental Issues. *Journal of Social Issues*, 56:3, 391-406. Wiley-Blackwell
- Sevillano, V., Aragonés, J. I., & Schultz, P. W. (2007). Perspective Taking, Environmental Concern, and the Moderating Role of Dispositional Empathy. *Environment and Behavior*, 39(5), 685–705. <https://doi.org/10.1177/0013916506292334>
- Ulrich, Roger (1993). Biophilia, Biophobia, and Natural Landscapes. *Biophilia, Biophobia, and Natural Landscapes*.

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Appendix A

IRI Question	Treatment 1 (background)	Treatment 2 (uninjured wildlife)	Treatment 3 (injured wildlife)
I often have tender, concerned feelings for people and animals less fortunate than me. 1 (Very much like me)- 5 (Not at all like me)	1.5	1.5	1.4
When I see someone being taken advantage of, I feel kind of protective towards them. 1 (Very much like me)- 5 (Not at all like me)	2.4	1.3	1.4
Other people's misfortunes do not usually disturb me a great deal. 1 (Very much like me)- 5 (Not at all like me)	4.1	3.9	3.6
<i>Average</i>	2.7	2.3	2.1

Table 1. Average values per treatment group for the preliminary questions prior to treatment reflection. Numerical values represent the response from 1 (very much like me) to 5 (not at all like me)

NEP Question	Treatment 1 (background)	Treatment 2 (uninjured wildlife)	Treatment 3 (injured wildlife)
When humans interfere with nature it often produces disastrous consequences. 1 (Agree)- 3 (disagree)	1.4	1.6	1.4
Human ingenuity will ensure that we do NOT make the earth unlivable. 1 (Agree)- 3 (disagree)	1.7	2.2	2
Humans are severely abusing the environment 1 (Agree)- 3 (disagree)	1.3	1.3	1.1
Animals have the same right as humans to exist. 1 (Agree)- 3 (disagree)	1.6	1.4	1.4

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The balance of nature is strong enough to cope with the impacts of modern industrial nations. 1 (Agree)- 3 (disagree)	2.7	2.5	2.8
<i>Average</i>	<i>1.74</i>	<i>1.8</i>	<i>1.74</i>

Table 2. Average value per treatment group for preliminary New Ecological Paradigm (NEP) questions. Numerical Values represent the response from 1 (agree) to 3 (disagree).

Post Treatment Question	Treatment 1 (background)	Treatment 2 (uninjured animal)	Treatment 3 (injured animal)
To what extent do you believe wildlife is impacted by pollution? 1 (Very much) - 5 (not at all)	1.3	1.3	1.2
How concerned are you about litter? 1 (Very concerned) - 5 (Not at all concerned)	1.3	1.3	1.3
Should the United States government laws restricting litter be more strict, less strict, or about as strict as they are now? 1 (More strict) – 3 (less strict)	1	1.3	1
How willing are you to change your lifestyle to reduce the damage you cause to the environment? 1 (Very willing)- 4 (Not at all willing)	1.3	1.4	1.5
<i>Average</i>	<i>1.225</i>	<i>1.325</i>	<i>1.25</i>

Table 3. Average value per treatment group for New Ecological Paradigm (NEP) questions, used to compare between groups.

Appendix B

Treatment 1

- I felt angry and upset by all of the photos. Littering is something that is easy to avoid yet so many people do it. I often catch myself looking at all the garbage on the ground in areas around me. It is hard to believe that people literally just throw their garbage on the ground. These photos upset me because it shows how careless and selfish, we are.
- I noticed all of the trash - it made me angry and sad. I think the ocean photos made me sadder for some reason- I think humans perceive the ocean as some beautiful untouchable place and when we see trash in it is saddening
- They all made me feel disappointed as they all showcased pollution. At first, I felt calm and peaceful looking at the second picture, then noticed the string or fishing line in the tree. The second one also makes me think of the willful ignorance of people: it's not a glaring issue, chances are that people will look right past it.
- The trash shows how little respect humans have for the Earth and nature. They were all just disgusting.
- I noticed the nature and the trash that is ruining it the most. My emotions were the same.
- Emotions were same. Mostly bummed and a little irritated at the people who did it. I wanted to clean it up mostly irritated at first one because that is easier to manage.
- The first thing I noticed in all three photos was the trash. It was distracting and upsetting. It made me sad that it is all preventable, and yet is such a persistent problem in our society today. It not only harms the beautiful landscape, but can be fatal if not all, the animal exposed to the trash in their ecosystem.
- Throughout all of these photos, I would say that I noticed the neglect of human responsibilities the most. If we, as human beings, are to enjoy a park, a beach, or an ocean, we must pick up after ourselves and leave the environment better than we found it
- Pollution in nature. You don't like to see it but it didn't make me feel anything negative, because they're just pictures.
- When I was looking at the photos, my immediate observations were always about how humans are interacting/tampering with the natural environment. It may be my background in studying this that makes me sensitive to it. Looking at the photos made me angry at humans for abusing the environment, no matter that the photo was of.
- In all of them I noticed the trash, specifically plastic, polluting the environment around it. This can affect wildlife and plant life around it.
- I noticed that litter is everywhere. Plastic is overtaking the ocean which makes me sad. The second photo was nice because I didn't see any trash, rather it felt like a calming photo of seemingly untouched nature. These photos make me frustrated because I feel like I personally do so much for the environment (altered diet, compost and recycle, try to limit buying plastic, limit fast fashion purchases, etc.), but I believe large corporations, energy companies, etc. are those who have the power to make major

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changes for the environment. Yet, this neoliberal model we choose to abide by puts money and profit before people and the environment.

- The most noticeable elements of the photos were the trash that acts as a distraction to what could be an ideal landscape photo. The emotions I felt were mostly disappointment, not only in the photo is there a trash can, but it is not holding the trash, instead it is strewn out on the landscape. I think that says a lot about our environmental efforts from the past. The images gave mostly the same impression with the 2nd as the exception due to the lack of obvious human manipulation.
- I noticed natural landscapes being disrupted by scatterings of trash. It made me angry looking at all three photos. Nature does not deserve to be treated in such a manner.
- Picture 1- Upset about people leaving an area in that manner, be a decent human and pickup after yourself. Noticed the dumped over trash the most.
Picture 2- Noticed the tangled fishing line in the tree, make an effort to remove that line. Slightly upset that it was left when it seems like it would have been easy to reach.
Picture 3- Upset that garbage is just being tossed in the ocean.
- I had strong emotions of sadness and disappointment. I mostly noticed the sun in the photos and the unnatural placement of trash on the landscape. I felt the same for each photo and was just upset and angry.
- What I noticed was disregard for the environment, including litter, carelessness, and even some abuse. Pictures like these always make me angry and the last one with the ocean made me the most upset
- Human intervention Always managed to sneak into beautiful images of nature
- Well all of the photos included human trash or waste contaminating nature. The first struck more of a chord with me because that is what I am most used to seeing. In fact I was camping just last week and saw that in person. The second picture didn't really bother me because I didn't understand what I was looking at. The third only made sense because of the current hype about sea turtle. As horrible as it may be, the whole sea turtle thing has never personally affected me (I live on a farm in the middle of Nebraska. I've never even seen a sea turtle let alone the ocean) so it doesn't bother me much. The first definitely induced the most emotion. I've spent time myself cleaning up similar messes and it's a horrible thing.
- I noticed a lot of litter. The last photo especially induced a lot of disgust and fear. Those water were unswimable for both humans and other animals.
- I noticed the litter in the first two and it made me sad. I felt as though I should clean it.

Treatment 2

- I noticed the presence of unnecessary plastics the most and my emotion was disturbance. Our pollution is often unnecessary and prohibits animals from living peacefully as they would without us
- I noticed most in each of the photos trash and animals. What I noticed least are the other parts of nature surrounding those factors such as the ground, tree, or water- in all three photos shown. The photos made me feel mostly grief. All of them made me feel some sort of grief but the last one hit harder and made me feel a little more than the previous two shown. The last photo truly represented how trash and waste is

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affecting more than just one species and how it effects something to beautiful, like the ocean.

- What I would usually notice first was the animals, then the garbage around them. For a second, I liked the images because I love animals so much. Then I was angry because I think people are awful and there should not be that much trash in the environment.
- Human activities negatively affecting the environment. I felt bad on some more than others
- I noticed the trash in the photos along with the animals. It induced feelings of disgust that trash ends up in nature where it should not be.
- I noticed the plastic and disturbance it was causing to the wildlife in the pictures. My emotions were quite strong. No change in feelings per different pictures.
- I enjoyed seeing the animals in the photos, but I didn't like all the trash surrounding them. It makes me sad to see them in environments like that
- I noticed pollution in each photo and wildlife forcing to interact with that pollution. When looking at the photos I felt disappointed in the trash that was spilling over into natural environments- I felt this way for each photo.
- Each of the photos shows how the environment is being impacted by human activity. The greatest feeling, I had was one of disgust.
- The trash in all of the photos. It makes me sad to see animals in their natural habitats and us as humans wrecking them.
- I noticed most the difference between the beauty of the animals themselves and the ugliness of the polluted environment around them. I felt all sorts of emotions, from anger, sadness, to empowerment. Anger and sadness were my initial reactions because it's sad that these animals are already living in such as polluted environment. Empowerment because seeing those images gives me motivation to keep trying to make a change so those animals don't have to live like that.
- Disturbing, repelling relationship between nature/animals and trash. Feels wrong. The last photo of turtles swimming in plastic especially. Why? Because it is not natural. I would not want to be living in these settings myself as a person.
- I noticed the trash from humans in the pictures. It made me feel angry and sad. We can have a large negative impact and aren't taking the steps to rectify.
- I noticed the animal sitting in trash, the fishing wire hanging from a tree, and litter in the ocean. It made me extremely upset, almost distraught, for each picture because it's awful. We're killing animals and destroying their environments and its upsetting.
- I noticed that each photo had garbage and wildlife that could easily interact and be at severe risk from the garbage or litter. The last photo especially made me feel very sad and anxious, because the manta ray had its mouth open and could easily consume the garbage, while turtles are well known to consume plastic mistaking it for food. It was also jarring just how much trash was there. It was like the animals couldn't escape it. The second one was less emotional, because the fishing wire looked like it was part of the photo. At first it took me a second to realize it wasn't a natural part of the tree. The photo also looked natural and beautiful. The first one was I was so

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focused on how cute the badger was! And I think it's a very common sight to see raccoons and other wildlife in trash. But I also know it isn't healthy.

- I felt that there was a piece of human activity in every photo. Noticed a lot of plastic. I didn't see a lot of open nature. Felt disgusted.
- All pictures included representative components from both humans and the natural world---the human component was negative or adversely affecting/damaging/risking the health, safety, or rights of the natural element. Emotions that I felt while viewing these images included frustration, anger, confusion, guilt, and responsibility. My emotions very strongest in the final picture (underwater picture), second strongest in the first picture (skunk with human trash), and weakest in the second picture (bird with string). I think I was most frustrated by the quantity of plastic in the oceans and the lack of control or escape the marine life has in this environment. Birds can fly away, and skunks can run off, but marine life are surrounded by plastic pollution constantly.
- I noticed the litter. The picture with the turtle and manta ray filled me with dread. The litter was everywhere, and the animals were likely to consume the litter by accident or mistake. The picture with the skunk had garbage as well. The skunk seemed to be digging through the trash for food. I felt less dread because it seems that maybe the skunk may be able to coexist with humans as they are. The pelican picture made me feel at ease. The balance in nature was present
- Frustration. People don't care about the environment. We are going to become extinct. I have no hope for the future. My individual choices support a healthy earth and climate, but others are too selfish. It sucks making the right choices and being helpless because so many other people don't care.
- It was incredible to see stunning photos of those landscapes and wildlife. It was extremely disheartening to see the negative impact humans are creating.
- I noticed the repeated colors (blue) and the garbage. The first and third induced a sad or Moved feeling. The emotions were different, though, and stronger in the first photo, because it feels much more personally preventable than the last. The second was fine. Peaceful.
- As a Christian, I will give an answer from what I have been taught. We have been given by God to be stewards of His creation. This means that we are to take care of what He has given us. So, I do not agree to littering, poaching, or needless destruction of the land. That being said, we as Humans are absolutely and entirely incapable of destroying the Earth even if we wanted to. Why? Because God made it. He is still in control, and I do not believe that we as the creation could ever hope to overthrow anything that is from the Creator. So, on that note, we should care for the Earth and not abuse the gift we have been given here. But we should also not believe that we are destroying the planet, as we have absolutely no power to do so. Take care of the planet because you love its beauty. Do not take care of it because you believe that it is dying, and you can save it

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- I had no problem with the skunk and the trash, as it was likely just finding food from the "waste." The pelican was not in danger although there was a plastic or string in the tree. I was concerned for the sea life due to plastic waste.
- I noticed a lot of litter and how it impacts animals. It made me sad to see, but I've become so used to it lately that it didn't surprise me.

Treatment 3

- The most powerful emotion I felt while looking at these photos was disappointment. These photos showcase the neglectfulness of humans and our lack of consideration or care for the beings we share our planet with.
- I noticed that in all 3 photos there was an obvious human factor causing detriment to the individual animals. I felt ashamed and also impressively sad due to the photos. I felt about the same amount of shame and sadness for all 3 pictures shown.
- Animals and nature surrounded and in danger from trash. It's very upsetting to look at for all of them, I think the most upsetting was the bird entangled in the tree by some kind of wire. It shows that this waste can be life threatening and cause suffering for the animal.
- Obviously, I noticed the animals first, and then the trash, and then the environment that they were in. My emotions on the first photo had me feeling mixed emotions, since the skunk was getting to enjoy a meal due to the trash left over. Also, the trash can was tipped over, so good human intentions for localizing their waste were attempted. The 2nd picture, the one of the stork/pelican/whatever large white bird that was (I'm not an ornithologist) had me feeling angry. I felt as though the survey was baiting with specifically bad pictures by that point and that you were trying to sway my opinion to one specific way instead of being unbiased. I definitely agree that we need to decrease our waste and emissions to try and make the Earth habitable for our next generations and the other animals that live here, but I don't like feeling manipulated to think that way.
- I felt sad for the animals because they shouldn't be hanging from a tree, swimming in the trash, and going through trash bins and then getting their head stuck in one can.
- I noticed how human trash was impacting wildlife and causing a disturbance to them. It made me feel sad even though I do my part in the environment and recycle and not put everything in a landfill or the ocean. The sadness comes from other people not doing their part. It hurts me to see wildlife hurting.
- All the photos have human trash in the environment. This trash causes wildlife to be harmed in many ways. I felt sad for the animals because we are harming them
- I felt saddened that the animals died due to the negligence of people. If people would. E more thoughtful they wouldn't have died and that's a not right.

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- There was a bunch of garbage in each photo and the animals unfortunately looked in many cases as though the garbage was causing them harm. It made me feel a bit sad and helpless. It doesn't feel right that a careless act by humans might have wildlife without anyone knowing or caring what their actions caused. The image of the raccoon (?) Didn't seem like it was harmed and maybe even benefiting from the trash, I felt pretty neutral about that one
- There was so much human made litter. It makes me mad, angry, and so very very sad. No, all of them are upsetting.
- Annoyed by the skunk, sad for the other ones.
- Each of those photos gave me varying feelings of sadness and guilt. I did notice that I felt worse when the animals were more involved, and picture #2 made me feel the worse, while #3 made me feel less so. Seeing an animal directly interacting and being affected by the human pollution struck those negative emotions in me.
- The photos made me sad and caused me to think about how manmade influences damage the environment. The second and third photo were particularly powerful because they show the impacts of environmental degradation.
- I noticed there was trash in each photo and an animal that has been caught in it. It induced feelings of mostly resentment. My feelings were the same for each one but stronger for the dead bird because it's a reminder of how often wildlife falls victim to our carelessness.
- I noticed all the trash. The picture with the trash can made me think that the animal was just looking for food. But the other pictures were safe. It made me realize that the animals are looking in trash for food because they can't get food anywhere else
- I viewed the animals as victims of the irresponsible acts of humans. Even though the trash was thrown into a trash can in the first image it seems that people don't think about what happens beyond trash is disposed of. I felt sad and angry because animals are dying because of human-made waste
- I noticed a lot of animals being killed due to waste. It makes me sad and frustrated that we care so little about our environment and our effects on it. My emotions were mostly the same with varying levels of sadness from the severity.
- All of the photos had to do with trash pollution and their effects on different animals. The images induced feelings of guilt, because most if not everyone has littered in their life, but the feeling stayed constant for all the images even though their impacts were of varying severity any pollution should be seen as avoidable.